CLAIMS

1. A method of measuring signal timing to be used in the CDMA radio system comprising at least three base stations (102 to 106) and a terminal (100), which multiply a signal by a spreading code, and in which method the transmission of a base station comprises various code channels (CH1 to CH3) transmitted by different spreading codes, on one of which code channels a predetermined symbol sequence (200) is transmitted, and in which method the terminal (100) is in connection with at least one base station (102), on whose timing the terminal (100) stores data, **characterized** by

conveying data on at least one code channel (CH1, CH2, CH3) transmitted by at least one neighbour base station (104, 106) via a serving base station (102) to the terminal (100),

the terminal (100) determining on the basis of said data the spreading code of at least one code channel (CH1, CH2, CH3) and an estimate of the symbol timing of each code channel (CH1, CH2, CH3) in respect of the timing of the serving base station (102), and

the terminal (100) utilizing on the basis of these data on code channels at least some of the code channels (CH1, CH2, CH3) of the neighbour base station (104, 106) to measure the signal timing of the neighbour base station (104, 106).

2. A method as claimed in claim 1, **characterized** by the terminal (100) utilizing at least some of the predetermined symbol sequences (200) transmitted on the code channels (CH1, CH2, CH3) by the neighbour base station (104, 106) to measure the signal timing of the neighbour base station (104, 106).

3. A method as claimed in claim 1, **characterized** by the base station (102) serving the terminal (100), the base station controller (108) or some other unit in the fixed network requesting data on the code channels of at least one neighbour base station (104, 106) via the fixed network part.

4. A method as claimed in claim 1, **characterized** by the neighbour base station (104, 106) selecting for data transmission code channels (CH1 to CH3) which have the highest transmission power in the direction of the base station (102) serving the terminal (100).

5. A method as claimed in claim 1, **characterized** by the timing measurement also utilizing the sync channel.

6. A method as claimed in claim 1, **characterized** by the terminal (100) measuring the signal timing from at least three base stations (102 to 106) to locate the terminal (100).

7. A method as claimed in claim 6, **characterized** by the terminal (100) transmitting data on the signal timing of the base stations to the fixed network part of the radio system to locate the terminal (100).

8. A method as claimed in claim 6, **characterized** by the terminal (100) determining its own location by means of the signal timing.

9. A method as claimed in claim 1, **characterized** by the terminal (100) measuring the signal timing with some other neighbour base station (104, 106), if the signal timing fails with one neighbour base station (104, 106).

10. A method as claimed in claim 1, **characterized** by the neighbour base station (104, 106) adding to its transmission at least one code channel (CH1, CH2, CH3) on which a known symbol sequence is transmitted to measure the signal timing of the terminal (100), and the neighbour base station (104, 106) conveying via the serving base station (102) to the terminal (100) data, on the basis of which the terminal (100) uses said code channel (CH1, CH2, CH3) to measure the signal timing.

11. A method as claimed in claim 2, **characterized** by the terminal (100) receiving predetermined symbols (200) on several code channels (CH1 to CH3) of the same base station (102 to 106), the symbols being transmitted time-division multiplexed by the base station (102 to 106) on several channels (CH1 to CH3) in such a way that the predetermined symbols (200) of different code channels arrive at substantially different times.

12. A method as claimed in claim 2, **characterized** by the terminal (100) decoding the received spreading coding of the signal of the code channel, multiplying the signal by a predetermined symbol sequence (200) to generate an estimate of the impulse response of the channel and measuring the timing of the received signal by coherently averaging the estimates of the impulse response.

13. A radio system, which is a CDMA radio system in particular, comprising at least three base stations (102 to 104) and a terminal (100) which are arranged to multiply a signal by a spreading code, in which radio system the transmission of a base station comprises various code channels (CH1 to CH3) transmitted by different spreading codes, at least one of which code

channels comprises a predetermined symbol sequence (200), and the terminal (100) is in connection with at least one serving base station (102), on whose timing the terminal (100) stores data, **characterized** in that the serving base station (102) is arranged to convey data on at least one code channel (CH1, CH2, CH3) transmitted by at least one neighbour base station (104, 106),

the terminal (100) is arranged to determine on the basis of said data at least the spreading code of at least one said code channel (CH1, CH2, CH3) and an estimate of the symbol timing of each code channel (CH1, CH2, CH3) in respect of the timing of the serving base station (102), and

on the basis of data on code channels the terminal (100) is arranged to utilize at least some of the code channels (CH1, CH2, CH3) of the neighbour base station (104, 106) to measure the signal timing of the neighbour base station (104, 106).

14. A radio system as claimed in claim 13, **characterized** in that the terminal (100) is arranged to utilize at least some of the predetermined symbol sequences (200) transmitted on the code channels (CH1, CH2, CH3) by the neighbour base station (104, 106) to measure the signal timing of the neighbour base station (104, 106).

15. A radio system as claimed in claim 13, **characterized** in that the base station (102) serving the terminal (100), the base station controller (108) or some other unit in the fixed network part is arranged to request data on the code channels of at least one neighbour base station (104, 106) via the fixed network part.

16. A radio system as claimed in claim 13, **characterized** in that the neighbour base station (104, 106) is arranged to select for data transmission code channels (CH1 to CH3) which have the highest transmission power in the direction of the base station (102) serving the terminal (100).

17. A radio system as claimed in claim 13, **characterized** in that the terminal (100) is arranged to utilize also the sync channel in measuring the timing.

18. A radio system as claimed in claim 13, **characterized** in that the terminal (100) is arranged to measure the signal timing from at least three base stations (102 to 106) to locate the terminal (100).

19. A radio system as claimed in claim 18, **characterized** in that the terminal (100) is arranged to transmit data on the signal timing of the signals of the base stations (102 to 106) to the fixed network part of the radio system to locate the terminal (100).

20. A radio system as claimed in claim 18, **characterized** in that the terminal (100) is arranged to determine its own location by means of the signal timing.

21. A radio system as claimed in claim 13, **characterized** in that the terminal (100) is arranged to measure the signal timing with some other base station (102 to 106), if the timing measurement fails with one base station (102 to 106).

22. A radio system as claimed in claim 13, **characterized** in that the neighbour base station (104, 106) is arranged to add to its transmission at least one code channel (CH1, CH2, CH3) comprising a known symbol sequence to measure the timing of the terminal (100), and the neighbour base station (104, 106) is arranged to convey via the serving base station (102) to the terminal (100) data the terminal (100) uses in measuring the timing of the code channel (CH1, CH2, CH3).

23. A radio system as claimed in claim 14, **characterized** in that the terminal is arranged to receive the predetermined symbols (200) on various code channels (CH1, CH2, CH3) of the same base station (102 to 106), the symbols being transmitted time-division multiplexed by the base station (102 to 106) on various channels (CH1 to CH3) in such a way that the predetermined symbols (200) of different code channels arrive at substantially different times.

24. A radio system as claimed in claim 14, **characterized** in that the terminal (100) is arranged to decode the received spreading coding of the signal of the code channel, to multiply the signal by the predetermined symbol sequence (200) to generate an estimate of the impulse response of the channel and to measure the timing of the received signal by coherently averaging the estimates of the impulse response.